Space Weather Forecast

Issued on Wednesday, 22 February 2023 at 13:58 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 radio blackouts likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with three Moderate-class flares observed. Six numbered sunspot regions are on the visible disc. Of particular note is a sunspot in the northeast, which continues to grow in areal extent, though is seemingly becoming more magnetically simple. A spot in the north centre disk is also of note, with activity from this spot in recent days. The final sunspot worthy of comment is one which lies in the southeast, this spot has shown some minor growth of its trailing portions. All other spots are small or simple.

Currently no significant Earth-directed coronal mass ejections are forecast, although glancing impacts may occur on days 1/2 and 4 (Wednesday/Thursday and Saturday).

Solar Wind / Geomagnetic Activity: Solar winds were indicative of lingering coronal mass ejection influence from an even which left the Sun back on 17 February. The solar wind has been mostly Slightly Elevated. The interplanetary magnetic field has been at Moderate levels throughout peaking around 21/1500 UTC. The north-south component, was mostly positive, with fluctuations between Moderately positive to briefly negative. The net result of the above solar wind measures has been mostly Quiet to Unsettled (Kp 0-3), with a peak of Active (Kp 4) seen in the 12-15UTC period on 21st.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is forecast to continue, with the presence of both the strong class-producing group and now a new potent and growing region in the northeast. Both of these dominant groups should be present throughout the coming four day guidance period.

Solar Wind / Geomagnetic Activity: There is a slight chance of glancing impacts from coronal mass ejections, possibly arriving later day one or into day two then during day four. Earth is in a slightly elevated solar wind regime, with an expected increase in solar wind speeds due to a 'coronal hole' high speed stream during the UTC morning of day one, Wednesday 22 February. This may give a peak slight chance of Minor Geomagnetic Storm for the four-day period, reducing with time to largely quiet conditions by the end of the current UTC week (with moderate confidence given the possibilities of coronal mass ejection shocks).

Energetic Particles / Solar Radiation: Solar radiation carries a slowly increasing slight chance of rising towards the S1 level, perhaps exceeding it, should any suitable larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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